High-Frequency Flush Mounted Miniature LOX Fiber-Optic Pressure Sensor II, Phase II

Completed Technology Project (2005 - 2007)

Project Introduction

Luna Innovations has teamed with the University of Alabama, Huntsville, to develop a miniature flush-mounted fiber-optic pressure sensor that will allow accurate, high-frequency high-pressure measurement of LOx and LH2. The Innovation of this proposed development is that the miniature flush-mounted fiber-optic pressure sensor is not intrusive, is intrinsically safe, and is a novel adaptation of proven technology. To insure compatibility with the LOx environment, the sensor has been constructed from metal-oxides, ceramics and other materials that are intrinsically safe. The sensor will help engineers optimize performance of liquid fueled rocket engines for the next generation of reusable lift vehicles, and flight versions of the sensors will enable real-time monitoring and control of the engines, improving safety and enabling commercialization of space. During the Phase I, prototype sensors were demonstrated in Liquid Oxygen (LOx) at temperatures of -196

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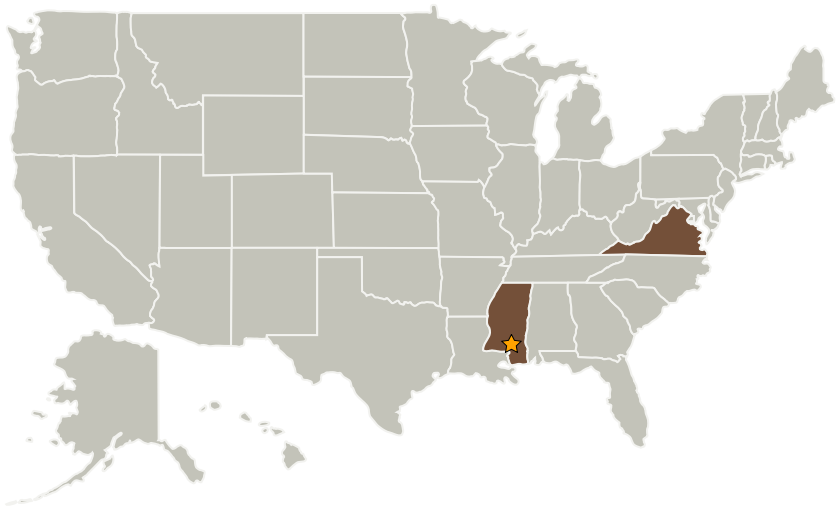
C. The sensor was able to measure pressures over 1000 psi and transients exceeding 4500 psi/sec rates of change without failure. During the Phase II, optimized thermally compensated sensors will be constructed and extensive tests conducted to advance the technology to pre-production status. This system meets NASA's goals by providing LOx and LH2 pressure data while: 1) minimizing intrusion, 2) improving reliability, 3) having fast response time, and 4) being intrinsically safe.

Primary U.S. Work Locations and Key Partners



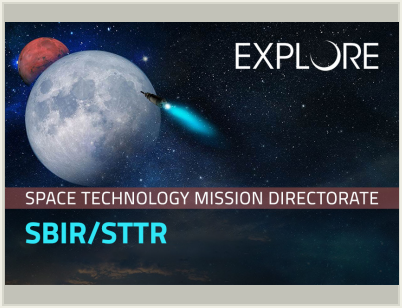


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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Stennis Space Center (SSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi
Luna Innovations, Inc.	Supporting Organization	Industry	Roanoke, Virginia

Primary U.S. Work Locations	
Mississippi	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors